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AUTHOR Tang, Gladys

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ABSTRACT

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Do learning environments make a difference? A study on the acquisition of the English Interrogatives by three types of Cantonese classroom learners

Gladys Tang

Chinese University of Hong Kong

Abstract

This paper reports on a study which attempts to investigate the acquisition orders of the English Interrogatives established in three groups of Cantonese classroom learners. A goal of the study is to examine the effect of formal instruction on second language acquisition, to discover whether different intensity of classroom instruction has an effect on the acquisition order.

Within the framework of the experiment, an attempt was made to separate interlanguage (IL) knowledge from production, with an underlying assumption that classroom learners might know more than they could produce.

The results of this study reveal that despite different intensity of formal instruction and extent of informal exposure, the IL development of the three groups of classroom learners largely conformed to the universal sequence of development as far as production is concerned. Moreover, differences which may be attributable to IL variability between knowledge and production were also found. Rules relating to SV-inversion established from the learner's IL knowledge did not coincide with those established from production.

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Gladys Tang

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Introduction

The study of classroom second language development has attracted a great deal of attention recently partly because of pedagogical motivation; and partly because those interested in input studies have begun to ponder whether explicit form-focused teaching would create an effect on second language development. In many second or foreign learning situations, learners are generally exposed to the target language structures sequenced and highlighted by a teacher who in many cases is a non-native speaker of the target language. Therefore, examining the effect of this type of linguistic input on second language development is deemed necessary.

Empirically, in second language acquisition research, there has been a debate on what constitutes useful data with which SL learning processes and strategies can be deduced. Early IL studies which aimed at tracing developmental sequences among second language learners tended to base their analysis on oral, performance data. Selinker (1972) maintains that the only data useful for IL analysis are observable data (i.e. performance reflects one's competence); and he explicitly rejects the use of grammaticality judgments as a reliable source of information about the learner's transitional competence.

On the other hand, researchers adopting the generative paradigm, namely UG, in their explanation of second language development usually attempt to elicit SL learners' grammaticality judgments so as to characterize their IL "competence".[1](White 1986, Liceras 1985).

While acknowledging the information of these two types of data may yield, some other researchers take an interest in examining the relationship between IL competence and IL performance. These research studies, though not many, can roughly be grouped under the domain of IL knowledge and use, or in general terms, IL variability from a cognitive processing dimension

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[1]Researchers in this field have now and again indicated that their prime interest lies in investigating the competence of the SL learner, not his performance.

(Bialystok 1982, Sorace 1985, Sharwood Smith and Kellerman 1985). This paper is concerned with the third position mentioned above, with an objective to examine the effect of different learning environments on the SL development of three groups of Cantonese learners of English. It is argued here that striking an empirical distinction between 'competence' and 'performance' in examining classroom SL development is deemed necessary in order to achieve a better understanding of the learning processes characteristic of a formal classroom learning context.

2.1 Two Dimensions of Classroom Second Language Research

2.1.1 The 'Natural Order' of Second Language Development

Studies on naturalistic second language acquisition generally conclude with the finding that SL learners who acquire language in this type of environment follow a universal order of development. In fact, there has been a constant debate on how useful pedagogical input can be in second language acquisition. The heart of the argument lies in whether SL learners make use of pedagogical input to formulate a corresponding set of hypotheses about the TL; or whether in fact, hypothesis formation and testing is an internally driven process. Advocates of the latter approach are Dulay and Burt (1973) and Krashen (1982). Felix (1981) and Felix and Hahn (1985) also suggest that at least some of the processes operating in naturalistic L2 and L1 acquisition are also found in tutored L2 acquisition such as 'decomposition' introduced by Wode (1981) to refer to acquiring a free morpheme not in a wholesale fashion but by gradually taking in the individual semantic features entailed. To these researchers, it is the internally driven language learning processes that are responsible for several striking similarities between L1 and L2 naturalistic acquisition. Seen in this light, the underlying language acquisition processes are 'immune' to external situational variables and classroom input should be as 'natural' as possible (Krashen and Terrell 1983); otherwise 'teaching efforts are doomed to failure when they are in conflict with naturalistic language acquisition principles' (Felix and Hahn 1985).

Despite these pronouncements on the universality of language acquisition, researchers have recently begun to

argue for the utility of pedagogical input, which in a second language classroom manifests itself as metalinguistic information provided by the teacher. Ringbom (1980) suggests that pedagogical input may relieve the learner of the burden of hypothesis formation about the TL structures which are provided 'ready-made' in the classroom. Faerch (1986) argues that pedagogical rules may be used to support foreign language learning despite being simplified 'rules of thumb' provided by the teacher. Recently, some researchers like White (1987) or Schachter (1986) go further to suggest that pedagogical input may be useful for certain aspects of grammar which cannot be 'comprehended' with the help of contextual meaning, or for which direct positive evidence is not available in the input data. An experimental conducted by White reveals that a temporary positve effect is shown in subjects receiving both positive and negative evidence in the classroom learning situation (White 1991). However, it is not at all certain at this present state of research whether providing direct or indirect negative evidence in classroom situations will facilitate second language development.

As far as the present study is conce ned, two possible effects of pedagogical input on SLA are being hypothesized:

(a) Its effects may be seen in the order of development of an IL feature, in this case, the development of the English interrogatives.

(c) It may lead to qualitative differences in IL knowledge in terms of the development of automaticity and analyticity of IL development, as defined by Bialystok (1981).

2.1.2 Cognitive Basis of Interlanguage Development

Recently, SL researchers working within a cognitivist paradigm have tended to adopt either the information processing model or the knowledge-control model. Proponents of the information processing model, who regard SL learning as the acquisition of language skills, claim that such development involves a gradual change from controlled to automatic processing via

practice (McLaughlin 1987).

In the knowledge-control model, IL development may be described as (i) the development of IL mental representations which may, in face of a perceived mismatch between the learner's IL grammar and target language grammar, undergo a reorganization of their internal structure; and (ii) the development of a set of SL procedures responsible for the creative activation and retrieval of IL knowledge in production and comprehension (Bialystok 1981, Bialystok and Sharwood Smith 1985, Faerch 1986, Sharwood Smith 1986). In other words, IL production or comprehension is the outcome of an interaction between probably a combination of knowledge sources available to the learner and a set of psycholinguistic language processing procedures.

The present study is based on an early conceptualisation of this framework found in Bialystok and Ryan (1983) in which SL development may be characterized as progress along the **Analysed Knowledge** and **Automatic Access** continua[2] (see Figure 1). Analysed knowledge refers to the level of structuring of the mental representations of knowledge. According to

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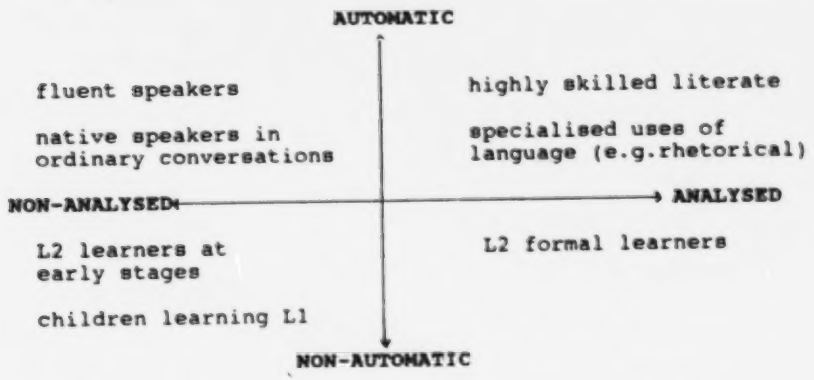
[2]Bialystok has changed her views on SL knowledge development quite substantially over the years. The **implicit-explicit** knowledge distinction which was developed earlier to account for the transferability of knowledge sources was later replaced by the more sophisticated **analysis-control** cognitive distinction. In the interim, Bialystok and Sharwood Smith (1985) seem to have incorporated both "knowing-that" (grammatical competence) and "knowing-how" (pragmatic competence) in the knowledge dimension while leaving the psycholinguistic procedures to the control dimension. In her recent reply to Hulstijn (1989), Bialystok defines the analysis-control distinction as cognitive dimensions each reflecting the learner's knowledge and skill. The kind of knowledge in the analysis factor is equivalent to the learner's mental representation of language, while the knowledge involved in the control factor is knowledge about the procedures of selection and coordination language information.

Bialystok, increasing control over the structure of knowledge along this analysed dimension implies that the learner is increasingly aware of and in control of its internal structural properties; and is able to apply the knowledge in new contexts of use. The second dimension, automatic access, as the name implies, refers to the level of efficiency or fluency with which knowledge may be accessed by the learner, irrespective of its degree of analysis. The following figure is taken from Bialystok (1981) for illustration.

Figure 1: Two dimension of language proficiency



Combining these two dimensions, SL development is viewed as progressing from the nonanalysed or the nonautomatic to the analysed or automatic end of the continuum. Development along these two continua is said to be independent, for example, knowledge that is analysed need not also be automatic.

In essence, both the information processing model and the knowledge-control model adopt a language processing approach towards the description of SL development. As McLaughlin (1987) himself claims, his model is concerned with the development of a complex language skill that involves cognitively the transfer and restructuring of information during the learning process, as SL development is measured principally by the efficiency with which this process is activated in

language performance. Recently, Hulstijn (1989) has further elaborated the information processing model by way of the cognitive psychological framework described by Anderson (1982). In this framework, the acquisition of language skills is considered as, apart from a gradual progression from controlled to automatic processing, a change in the form of knowledge from declarative to procedural representations.[3] According to Hulstijn (op.cit), applying Anderson's framework of the acquisition of cognitive skills to that of language learning, one can view "first and second language acquisition as the establishment of procedural knowledge (routine procedures) through the compilation of declarative language knowledge, and the gradual tuning and restructuring of procedural knowledge."

Seen in this light, what distinguishes the information processing model from the knowledge-control model is that the latter strikes a distinction, in terms of real time language processing, between the learner's mental representations and the cognitive procedures for accessing them. In the information processing model as discussed, this distinction is not maintained. It seems that the procedural knowledge as described encompasses both knowledge of language (in its procedural mode) as well as knowledge of routines and procedures (see footnote 3). What is at issue here is whether procedural knowledge includes domain specific linguistic knowledge as its content and Hulstijn appears to be arguing for its existence.

On the other hand, we find that in recent SL research, researchers prefer to restrict procedural knowledge to knowledge about how linguistic knowledge is retrieved and processed, while maintaining that declarative knowledge represents one's propositional, tacit knowledge of language (underlying linguistic

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[3]Anderson argues that during the process of **proceduralization**, the essential domain specific declarative information will be built into the new procedural knowledge (p.383). However, he claims that this does not imply a necessary loss of declarative representation of the knowledge, though it may cease to be used or simply be forgotten.

competence) which may be subject to manipulation in certain conditions (Faerch 1986). Whether or not procedural knowledge is knowledge of how linguistic knowledge is processed remains a matter of conceptual debate; nevertheless, one can see that maintaining such a distinction between the development of underlying knowledge and retrieval processes in language production and comprehension presents some advantages in SLA research.

2.1.3 Implications for classroom IL development

A consequence of maintaining such an empirical distinction in IL research is that the terms "acquisition" or "natural route of development" may be viewed in a different light. It has opened up the possibility of distinguishing the "competence orders" from the "control order". As Sharwood Smith and Kellerman (1986) states, a language structure may be acquired "in principle" (in the competence sense) but may suffer a long delay "in practice" (overt behaviour) due to some inherent processing problem. In other words, performance may not reflect competence in any sufficiently transparent way as was commonly perceived by many researchers. Methodologically, this distinction enables the researcher to discover whether a L2 form belongs to the learner's interlanguage competence, or whether that form is available to the learner but is not used in production, or whether that form is in conflict with other competing forms in the IL systems. This approach, then, may account for IL variability in the learner's performance and provide invaluable information on the process of IL development.

Within the conceptual framework of Bialystok in which the qualitative aspects of SL development may be characterised in terms of the degree of analysis and cognitive control, it is argued in this paper that the discrepancy between IL knowledge and production varies between different types of learners. In more specific terms, learners from different types of classroom learning contexts may demonstrate this discrepancy in different task situations. Following Ellis's (1985) arguments, different learning environments may lead to differences in the set of discourse domains engaged by the learner in such a way that they shape the types of

psycholinguistic processes and the quality of his SL competence.

To put it in the perspective of Bialystok's model, certain types of classroom learners may have relatively more analysed mental representations of the L2 system without being able, particularly in the initial stages of development, to apply them in production, especially in spontaneous production. In other words, it is possible that the development of L2 processing routines for some types of classroom learners may lag behind that of the IL knowledge. If this is the case, controlling for mechanisms necessary for production, or adopting production tasks which do not require automatized retrieval procedures, classroom learners would be able to demonstrate their knowledge more adequately.

A methodological consequence arising from this issue is how one can probe into the learner's underlying competence. The solution seems to lie in the adoption of grammaticality judgments. In fact, Corder (1981) suggests that a learner also has 'intuitions' about the grammaticality of his language which are potentially investigatable. Kohn (1986) argues that grammaticality judgments in the form of recognition tasks may serve this purpose, though indirectly. The argument goes like this: a sentence which is judged to be grammatical is said to be in congruence with the learner's IL competence (Arthur 1980, Gass 1983) and changes in the learner's grammaticality judgments may reflect the evolution of his developing grammar.[4] Sorace (1989) claims that 'if extralinguistic variables are appropriately controlled, interlanguage judgments actually reflect interlanguage knowledge'.

3.1 Previous Research on the Acquisition of English Interrogatives

There are several studies attempting to investigate the developmental sequence of the English interrogatives

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[4]Both researchers have indicated their concern over the techniques for eliciting learner's judgments of grammaticality and Chaudron (1983) provides an excellent discussion.

by naturalistic second language learners (Ravem 1978; Wode 1978; Huang and Hatch 1978; Cancino et. al. 1975; Butterworth and Hatch 1974; Adams 1978; Zobl 1982). From these studies, it appears that despite certain differences, L2 learners from a variety of different L1 backgrounds who acquire this structure in a naturalistic setting do progress in a similar though not identical fashion to L1 learners. The 'universal sequence of development' thus claimed may be described as follows:-

(1) Intonation and uninverted yes-no questions are first utilized for questioning purposes. Wh-questions first appear uninverted.

(2) Subject-Verb Inversion appears first in copular and modal sentences of both yes-no and wh-questions.

(3) Do-insertion in main verb sentences; it may or may not be inverted.

(4) Embedded questions begin to occur first with inversion.

Apart from Huang and Hatch (1978), there is another study in which a Chinese learner is involved. This study examines the simultaneous acquisition of the interrogatives in both English and Chinese. Kwan (1986) conducted a longitudinal observation of a Cantonese pre-school child who had just begun to acquire English in Singapore, a multilingual setting in which English served as the lingua franca. Certain parallel developments were found between this study and in L1 or L2 acquisition studies of the English interrogatives in a naturalistic setting. However, Kwan's study also presents an interesting case of 'cross-linguistic influence' within this simultaneous acquisition process. Unpreposed wh-words, which are rarely found in L1 and L2 acquisition studies, constitute the initial stage of the developmental sequence of wh-questions in English. Errors such as *'*You're going where?*' which reflect the corresponding declarative word order in English are in fact possible questions in Cantonese. The subsequent preposing of wh-words in English is later over-extended to Cantonese. During that time, her subject produced preposed wh-words

in Cantonese questions, yielding ungrammatical questions like

"mat yeh lei seung maaih?"
what you want buy
(What do you want to buy?)

Studies that concern classroom second language language acquisition are not many. Ellis (1984) investigated two L2 learners who received instruction in a full-time withdrawal situation (i.e. without any exposure to native speaking children). He examined the acquisition of negation, interrogation, and a number of verb phrase morphemes. All these structures were formally taught at one time or another during the nine months. He collected data from spontaneous communicative utterances produced by the learners in the classroom, which displayed a pattern of development more or less similar to that observed in naturalistic SLA. However, he found that some transitional patterns like uninverted YES-NO questions were prolonged and some other structures were slow to emerge (e.g. past tense forms). Ellis ascribes these results to the nature of the classroom discourse to which the learners were exposed.

In the Passau project, Felix (1981) observed the developmental sequence of negation, interrogation, sentence types, and pronouns for 34 German learners of English in an EFL environment. Parallel developments were found with these learners when compared with those who acquired the TL in a naturalistic setting. What he reports as striking was the use of uninverted intonation questions by the learners when these types of 'samples' were neither found in classroom instruction nor in the teacher's questions. At the same time, the learners did not resort to their German L1 which requires inversion in the main clause. Based on these results, Felix suggests that both naturalistic and instructed learners are adopting similar natural processing strategies, irrespective of their learning context.

The last study to be reviewed in this section involves a group of Chinese classroom learners of English (Chen 1986). Only a rapid written translation task was used in the experiment and the results suggest that the development of yes-no questions precede wh-questions,

which in turn precede alternate questions. Moreover, the development of inversion was found to be related to the development of the auxiliaries in the sense that confusion between DO-BE as a question operator appeared to be a more advanced error than inversion.

To conclude, results from the two classroom studies seem to suggest that the natural acquisition processes are not in any principled way suppressed by the input, however contrived. In fact, one common characteristic shared by these two studies is that the analysis was based on spontaneous speech as in the case of Ellis' study, and in the other study, from oral exercises recorded during the lessons. These studies made no provision for probing into the learner's knowledge of the target structure which might exceed that shown in his performance.

3.2 Cross-linguistic comparison between Chinese and English

In general, both English and Chinese match in their basic word order, in that both follow the SVO order in declarative sentences. Despite this similarity, Li and Thompson (1976) argue that, from a typological point of view, these two languages reflect two diversely different propensities for marking functions with word order. According to Thompson (1978), some languages like Chinese tend to utilize predicate-argument order primarily for pragmatic purposes, as in theme-rheme, given-new information or the topic-comment sentence organization. On the other hand, some languages like English essentially make use of word order for grammatical purposes such as signalling questions and exclamations. Based on this analysis, Rutherford (1987) comments that the form-meaning relationships are more indirect in English than in Chinese. However, it does not imply that these typological properties are in complementary distribution; rather, languages may accommodate both properties but show a preference for either one of them.

As far as the formation of questions is concerned, syntactically, English exploits word order to mark questions while Chinese does not. In English, wh-movement is involved in which the wh-constituent is

consistently preposed in questions. Subject-verb inversion is required in simple questions but not required in embedded questions. In fact, SV-inversion which changes SVO to VSO order is typologically less common than Wh-preposing. In particular, inversion in Yes-No questions, according to Ultan (1978), occurs in only seven out of thirty eight languages in his survey. In other words, inverted Yes-No questions are typologically more marked than uninverted Yes-No questions. Recently, Eckman et.al. (1989) claim that implicational relationships may be established in that SV-inversion in yes-no questions implies the same pattern in wh-questions which in turn implies wh-preposing.

As seen from the examples below, Chinese follows a declarative word order in both statements and questions and makes use of the existing grammatical constituent in the sentence like the adjectives, verbs, adverbs to form an interrogative constituent. Since this process does not involve a change of word order, functionally, the topic-comment organization may be maintained (examples (a) to (d) below). Unlike English questions, Chinese questions do not require SV-inversion. In Wh-questions, the Wh-constituent always remains in situ in the declarative sentence. And yes-no questions may be expressed by means of a sentence final particle or by disjunctive A-not-A constructions. Readers may refer to Tang (1990) for a specific grammatical description of the Chinese interrogative system.

Questions in Chinese

(a) wh-questions:

"beih dak taam bingo?"
Peter visit who
(Who does Peter visit?)

(b) Yes-no questions (Particle questions):

"beih dak cheung go ga?"
Peter sing Q-particle
(Does Peter sing?)

(c) Yes-no questions (Disjunctive questions):

"beih dak cheung m cheung go?"
Peter sing not sing
(Does Peter sing?)

(d) Embedded yes-no questions:

"ma leih mahn beih dak cheung m cheung go?"
Mary asks Peter sing not sing
(Mary asks Peter if he sings)

4.0 The Present Study

4.1 Aims and Hypotheses of the Study

The present study involves three groups of classroom learners who are subject to different degrees of intensity of formal classroom instruction and of the opportunity for informal exposure to the target language. An overall aim of the present study is to see whether such differences have an effect on the IL development of classroom learners with respect to (a) their acquisition orders of the English interrogatives, and (b) the relationship between the development of IL knowledge and retrieval of knowledge in production. The hypotheses can be divided into two groups. The first group concerns the acquisition order of the rules of the English interrogatives while the second group is related to variability between IL knowledge and production.

(a) Acquisition Orders

The null and alternative hypotheses thus tested are the following:

H_0: There are no significant differences in the order of acquisition of the rules of the English interrogatives between the three groups of subjects.

H_1: There are differences in the order of acquisiiton of the rules of the English interrogatives between the three groups of subjects.

(b) Variability between IL Knowledge and Production

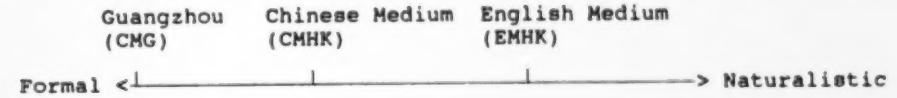
H_0: There are no differences in the performance of each group of subjects on the rules of the English interrogatives between tasks.

H_2: There are differences in the performance of each group of subjects on the rules of the English interrogatives between tasks and the order of difficulty of these tasks are may also be different.

4.2 Subjects

The three groups of subjects were typically from three different types of learning environment, two from Hong Kong (referred to as EMHK and CMHK) and one from Guangzhou (referred to as CMG). Schematically, they can be plotted on an formal/ naturalistic learning continuum.

Figure 2. Locating the learners on formal-naturalistic continuum



From each learning context, 45 subjects were randomly selected to be divided into three levels of proficiency according to their year of schooling (i.e. primary 6, secondary 2 and secondary 4).

The CMG subjects were reported to receive a traditional language teaching methodology which was basically grammar explanation supplemented by translation exercises and pattern drills which were sometimes done orally during the lessons. None of the subjects reported any informal exposure to English outside the school environment.

What differentiates the Hong Kong subjects from the Quangzhou subjects is that English is easily accessible within the wider Hong Kong context, and the mode of instruction in the Hong Kong context is also found to to different. While grammar-translation is heavily emphasized in the Guangzhou context, teachers in Hong

Kong seldom use this method but adopt a more eclectic approach which involves training in both language forms and their communicative values.

However, as reported by the CMHK subjects, the bulk of their exposure to English was derived from English lessons, as all other subjects as well as other school activities are conducted in the subjects' first language. Moreover, few claimed to be keen on investing their time in learning the English culture through films, TV shows ..etc which usually have Chinese subtitles.

The EMHK subjects, on the other hand, enjoyed a better facility in learning the target language in the sense that almost all content courses as well as extra-curricular activities were conducted in English. Some subjects were reported to have developed an interest and a regular habit of reading English novels and newspapers, and watching English films and TV programmes. However, they would seldom converse in English among themselves, except for class discussions and oral extra-curricular activities.

Although the three groups of subjects were sharing the same L1 background and were all classroom learners of a certain type, taught by a non-native speaker of the target language, they were differentiated by (i) their access to the target language in the wider community as well as the medium of instruction they received, which determines the extent of informal exposure available to them; and (ii) the characteristic mode of instruction and learning which they had undergone.

4.3 Elicitation tasks

The subjects were required to complete the following elicitation tasks: an oral task (OP), written dialogue completion (DC), timed grammaticality judgments (GJ), untimed error correction (CRC), and grammatical explanation (CRE). They were administered in the following sequence:

OP---> DC ---> GJ ---> CRC & CRE

The OP task required the subjects to construct a dialogue with a partner (usually the researcher himself)

with the help of cue cards. The DC task involved the filling in of an appropriate question in some short dialogues. As for the GJ task, the subjects were required to indicate the degree of grammaticality of a given stimulus on a 5-point grammaticality scale. They also had to indicate the certainty of their judgments on a 2-point certainty scale. In the error correction task, similar though not identical sentences were given; the subjects were asked to indicate whether these were grammatical without under time pressure. If a sentence was judged to be ungrammatical, subjects would have to locate the error, correct it and provide a possible explanation.

In general, the correction tasks as well as the grammaticality judgments were designed to examine the subjects' development of IL knowledge of the form. The correction tasks were designed to examine the subject's development of metalinguistic knowledge and the grammaticality judgment task for tapping the learner's intuitions which are taken to be indirect reflections of his underlying competence. The OP and the DC tasks were used to check if these subjects can produce appropriate questions in meaningful contexts. Built into these two groups of tests was the time factor, as the subjects were required to perform under both timed and untimed conditions.

4.4 Results and Discussion

This study attempts to investigate the development of the English interrogatives, namely yes-no questions, wh-questions and embedded yes-no questions as well as the related rules of question formation. In this paper, I will only concentrate on the development of inversion/non-inversion as well as the embedding process, while ignoring for the time being the development of the types of question, and the Q-operator.

The analysis was carried out with two statistical packages: For establishing the acquisition orders of the rules of the English Interrogatives by the three groups

of subjects, the Rasch analysis[5] instead of Guttman's implicational scaling was used. SPSSx procedures like ANOVA, MANOVA and Scheffe test were used to compare the subjects' development with respect to their performance on the elicitation tasks and the rules of the English Interrogatives.

4.4.1 The Acquisition Order of the rules of the English Interrogatives

Appendix 1a shows the acquisition orders established by the three groups of subjects. The accompanying sample statistics which can be found in Appendix 1b also suggest high reliability for most of the tests consistently reached a value of 0.9. The only test which has a slightly lower reliability index was the grammaticality judgment test where the value was around 0.7. During the analysis, the tasks were kept separate since it would allow the subjects' performance to be compared in different ways.

Generally speaking, all three groups of subjects were largely shown to follow a similar order of development with respect to the development of inversion rule in English questions, namely that inversion in yes-

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[5]The problems with Guttman's scaling have been documented in SLA research studies (see Hatch and Farhady 1982:182), and criticisms are usually levied on the adoption of an artificial cutoff point. The RASCH analysis provides an alternative because the cutoff point is no longer needed as the relationship between the difficulty of the grammatical categories and the ability of the subjects is described at a probabilistic level. In other words, by placing all the grammatical categories on a scale of difficulty, usually ranged between +5 and -5, it enables us to claim that if a learner has shown himself to have acquired a grammatical feature placed at a point on the scale, it implies that he has already acquired those features below it. In short, while allowing us to get round the problem of selecting an artificial cutoff point to determine whether a structure is acquired or not, the Rasch analysis is capable of capturing the learner's development on an implicational basis.

no questions were consistently found to develop earlier than that in wh-questions while non-inversion in embedded yes-no questions was found to cause the most difficulty. However, this interpretation is restricted to the production tasks only where errors of uninverted questions were evident in the data of all three groups of students and were more frequent than unpreposed wh-questions. Nevertheless, wh-preposing and inversion in yes-no questions were consistently occupying the bottom part of the difficulty scale for all three groups of subjects while the rules for embedded questions are usually at the top. These findings provide some evidence that as far as production is concerned, all three groups of classroom learners were following a similar order of development which is also pertinent to the 'natural sequence' established in previous SL 'performance' studies concerning naturalistic learners.

The results here suggest that environmental differences have no effect on the 'control' order of development, at least at the initial stage of their development as ample evidence of uninverted questions were found in the corpus for all three types of questions. This suggests either that the learner might at the outset assume that English questions are uninverted, possibly as a result of their being influenced by their knowledge of L1 or the universal processes of language acquisition, or that they have not yet developed the relevant procedural routines to retrieve this newly established knowledge of inversion in English questions.

For a preliminary answer to the question of whether these learners have already acquired the knowledge in principle while unable to retrieve it in practice, one may refer to the relative position of some of the rules plotted on the scales between the tasks. In the correction task (CRC), most of the rules were found at a lower position on the scale when compared with either the oral production (OP) and the written dialogue completion (DC) tasks, suggesting that these learners did have some metalinguistic knowledge of the interrogative system but were not ready to retrieve it in meaningful production.

A further examination of the scales reveals two facts. First, except for two cases, whether wh-preposing

precedes inversion in yes-no questions depends on the availability of time. In general, wh-preposing precedes inversion in yes-no questions whenever the task is untimed (e.g. DC or CR(E)) and follows it if the tasks is timed (OP or GJ). This phenomenon to some extent reveals the interaction between the learner's IL knowledge, be it analysed or intuitional, and L1 influence. Even though both rules are different from the L1 system of the learner, given sufficient time, it is the one that has attained greater analyticity that wins and overrides even the learner's L1 system.

Another discrepancy may be found in relation to the relative position of the connective in embedded yes-no questions between meaningful production and understanding of the form as shown in the CR tasks. In general, the most difficult rule in the OP and the DC tasks is the development of the connective 'if' or 'whether' while it is uninverted embedded questions in the CR tasks. This may be explained by the fact that during production, beginner learners especially had the tendency to produce uninverted embedded yes-no questions such as "I'd like to know you are a student" before this structure was eventually replaced by inverted embedded yes-no questions. On the other hand, in the CR task where learners were encouraged to retrieve metalinguistic knowledge in their performance, it is found that their knowledge of inversion in question formation is overextended to embedded questions.

Moreover, the acquisition orders established from the subject's grammaticality judgments reveal some discrepancies either between the three groups of subjects or when compared with the adult competence as established by a group of native speakers. With respect to the "competence order" established from the subjects' grammaticality judgments, two scenarios emerged from the analysis, (a) this order is different from that established from the subjects' metalinguistic knowledge; and (b) the CMHK and CMG subjects were following a similar order of development except that the CMHK subjects were shown to have great difficulty in acquiring uninverted embedded yes-no questions, as suggested by the higher position occupied by this feature (E:INV) on the scale. The EMHK subjects, on the other hand, displayed a great deal of variability of their intuitions and they

found inversion in yes-no questions more acceptable than the other two groups of students. More interesting still, findings from the native speakers on this feature indicated that they largely accepted uninverted yes-no questions to be grammatical, which stands in stark contrast with that observed among the Chinese medium students. Apart from this feature, it was also found that the relative position of the connective in embedded yes-no questions varies a great deal between the three groups of subjects. In general, when compared with the order established by the native speakers' of English, the EMHK order shows more similarities than that established by their Chinese medium counterparts. In sum, these results have two implications:

(a) the long established concept of the "natural order of development" in fact mirrors the learner's development only at the production level, in other words, it is a "control order", which in the case of the present study was found to be different from that established from the subjects' metalinguistic knowledge.
(b) the two examples given above provide some evidence that the retrieval of metalinguistic knowledge depends on whether sufficient time is given, as shown by a similar order established by the CMG and CMHK subjects from the written dialogue completion task.

One explanation for these findings is that what may account for the similar order of development with respect to the inversion rule is in fact a set of universal cognitive processes of language production available in L1 and L2 acquisition.

Another possibility is that there is a greater degree of indeterminancy in SL learner's judgments, which leads to the differences in the competence order between three groups of subjects. Sorace (1989) suggests that permeability of IL grammars may lead to greater variability and indecisiveness in learner's intuitions. Therefore, second language development may be regarded as a situation of decreasing indeterminacy tending towards native speaker's acceptability hierarchies as suggested by Ross (1979). Relating this discussion to the results of the present study, the acquisition orders established

by the three groups of subjects may be taken as an indication of their variable intuitions. Consequently, what is at issue here is whether these orders would subsequently merge or resemble that established by the native speakers. A recent study by Coppieters (1986) reveals that the underlying competence between very advanced learners and native speakers still shows significant differences.

4.4.2 The Relationship between the development of IL knowledge and Production Between the three groups of classroom learners

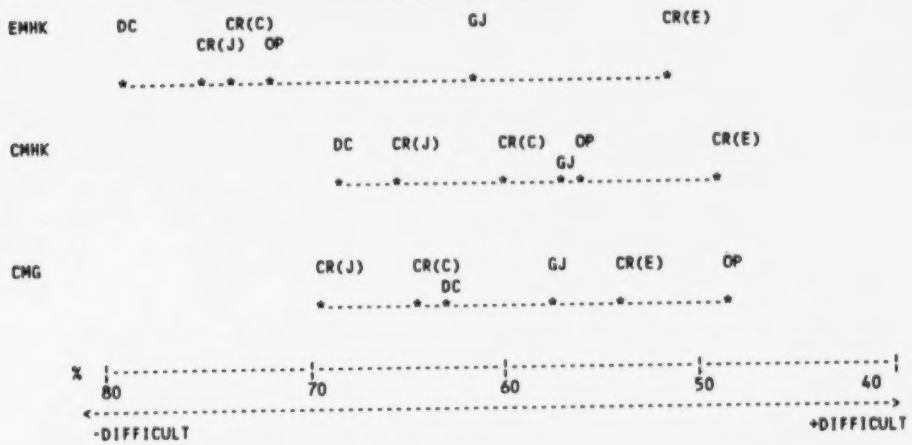
To further examine the issue of whether these classroom learners knew more than they could produce, our first procedure was to compare their performance on the tasks which were supposed to tap their knowledge of the target structures with those that involved retrieving knowledge of these structures in meaningful production. Appendix 2a and 2b present the percentages scores and the results of one-way ANOVA between the tasks as performed by the three groups of subjects. A point is in order here. For the sake of interest,the researcher decided to include the untimed judgments (CR(J)), which was the first step of the correction task, to contrast with the timed judgments.

The one-way ANOVA analysis revealed that each group of subjects performed differently between the elicitation tasks and the results were highly significant, all beyond 0.001 level. A post-hoc Scheffe test was conducted for each group to discover where the significant differences lie. The results of the Scheffe tests can be found in Appendix 2c.

The results from the Scheffe tests reveal that significant differences were found between the timed and untimed tasks. Within this framework of interpretation, better performance was found in tasks that were either untimed and/or involved emphasis on form than those that were timed and/or required the co-ordination of form and meaning. Although the grammatical explanation task (CR(E) also emphasized form, it was relatively more difficult to perform, especially for the Hong Kong subjects. The orders of task difficulty established by

the three groups of subjects are as follows:

Figure 3. Orders of task difficulty established by the three groups of classroom learners



The table shows that for all three groups of learners, the untimed grammaticality task (CR(J)), the correction task (CR(C)) and the written dialogue completion task (DC) are normally located towards the -difficult end of the continuum, followed by the timed tasks, suggesting that given sufficient time, classroom learners in general are capable of demonstrating their IL knowledge more successfully even in meaningful contexts.

Despite such similarities, differences were found. As regards the OP and DC tasks which involve situational dialogues but differ in the mode of communication, oral as opposed to written, the t-values between these two tasks as shown in Appendix 2c reveal that the discrepancy of the subjects' performance was found to be the greatest with the Chinese medium Guangzhou (**CMG**) subjects, followed by the Chinese medium Hong Kong (**CMHK**) subjects, but it was the least with the English medium Hong Kong (**EMHK**) subjects. This finding seems to indicate that the EMHK subjects were better able to retrieve both contextual knowledge and form almost regardless of whether the task is marked by automaticity or not. On the other hand, time is a significant factor for better performance with the two groups of Chinese medium subjects in general.

While the EMHK subjects, especially those at the S2 and S4 levels, were leading in their performance on the OP, DC and the GJ tasks, the results from the CR(E) task reveal that this group of subjects were largely inadequate in their ability to perform tasks which involve relatively more explicit metalinguistic knowledge, or 'articulated knowledge' in Bialystok's terms. The fact that it demands a higher degree of analyticity of IL knowledge did make the task relatively more difficult to perform although it concentrates only on form. On the contrary, it is the CMG subjects who outperformed the other two groups during the course of time, as revealed by the growing discrepancy between the scores at equivalent levels. Also, the consistently low scores between the P6 subjects of the three environments suggest that the development of metalinguistic knowledge, especially the ability of rule verbalization, is a rather late achievement. This finding is congruent with Sorace's results (1985) that the ability to make rules explicit is a relatively late attainment, even in a learning environment as formal as that found in Guangzhou where the students receive a greater amount of metalinguistic input.

Nevertheless, this does not imply that the IL knowledge of the HK subjects is down towards the unanalyzed end of the continuum. Despite the relatively poorer performance of the EMHK subjects in the CR(E) task, comparable performance in the CR(J) and CR(C) tasks was found at equivalent levels between the EMHK and CMG or the CMHK subjects, suggesting that the EMHK subjects are not disadvantaged at all despite the general lack of emphasis on grammatical input during their learning process, but they just failed to attain a higher level of analyticity.

On the other hand, although the CMG subjects fared better in tasks which tap form rather than function and were better articulators of grammatical concepts than their HK counterparts, they found performing under the pressure of time rather difficult, as shown by the position of the OP and GJ tasks on the scale of difficulty.

In sum, qualitative differences in terms of IL development automaticity and analyticity of IL

development were found between the three types of learners. In addiction, the general lack of significant differences in the CR(C) task between the EMHK and CMG or CMHK subjects as proficiency increases reveals the fact that the EMHK subjects could perform just as well on tasks tapping the +analyzed aspect of their IL knowledge. On the other hand, even though they started late in learning English, as proficiency increases, not only have the CMG subjects achieved a level of underlying competence comparable to the EMHK and CMHK subjects, but their IL knowledge is also qualitatively more analyzed than the other two groups. Even their level of automatic retrieval of IL knowledge is at a level comparable to the EMHK subjects by secondary 4.

5. Conclusion

The present results suggest that different learning environments do not necessarily create any effect on the 'natural order of development' but this claim is only valid so far as production is concerned. An analysis on the learner's developing intuitions reveal that they may be highly variable and the 'competence order' thus established does not necessarily coincide with the 'control order'.

Based on the framework of Bialystok's concept of analyticity and automaticity of IL development, it was found that the three groups of learners display qualitative differences in their development of IL knowledge and production. Learners having exposure to English as the medium of instruction display better development on the continuum of automaticity while those whose environment emphasizes an understanding of the formal structure of the target language show a better development of the degree of analyticity of their interlanguage. Such qualitative development as far as the formal learners are concerned appears to be crucial for determining the rate of IL development.

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Keys for the tables:

1. Learning environments

EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou

2. Year of training

P6: Primary Six
S2: Secondary Two
S4: Secondary Four

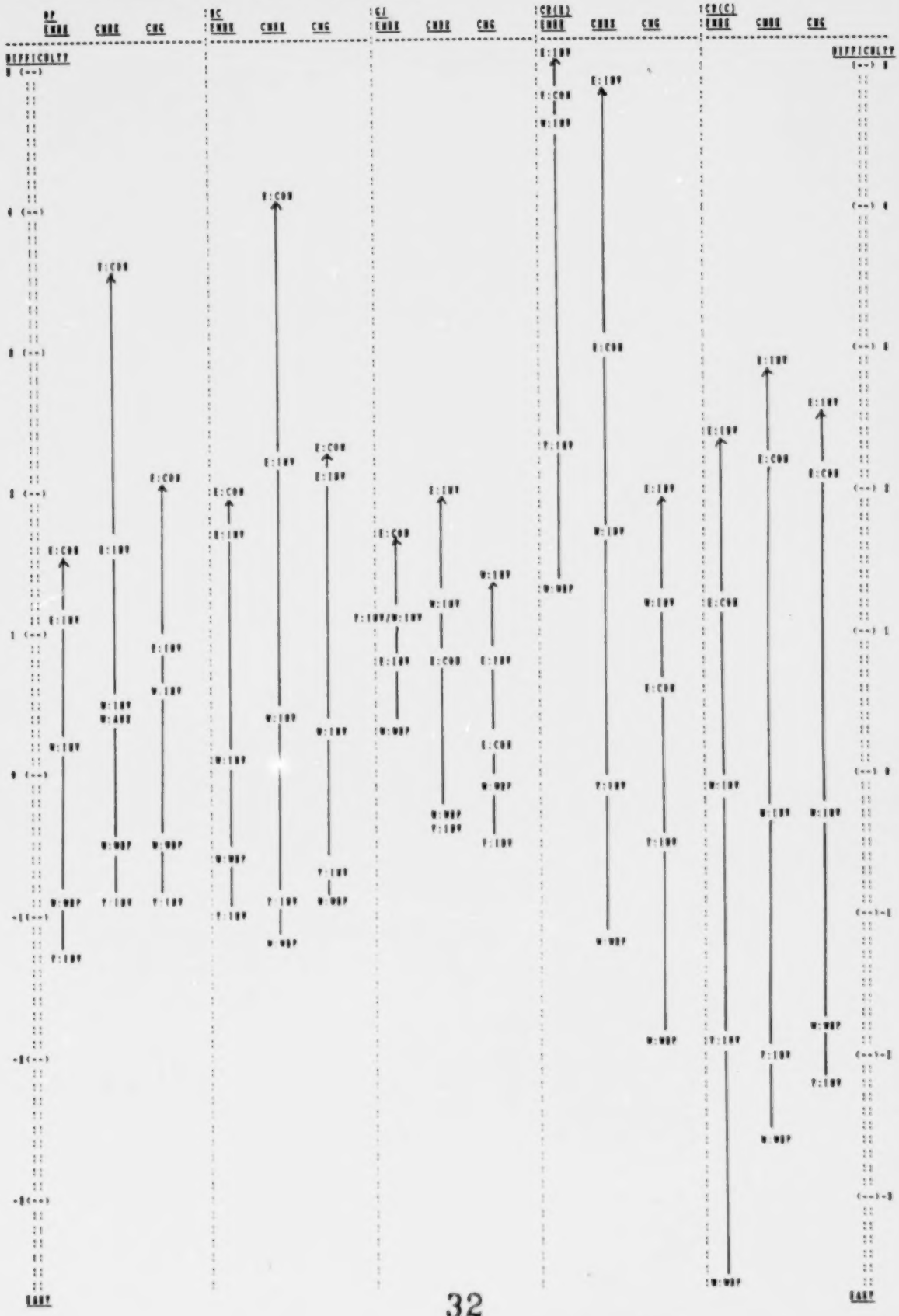
3. Types of Tasks

OP : Oral Production
DC : Written Dialogue Completion
GJ : Timed Grammaticality Judgments
CR(E) : Correction (Explaining)
CR(C) : Correction (Correcting Errors)
CR(J) : Correction (Untimed Judgments)

4. Grammatical Features:

W:WH-P : WH-preposing in WH-Qs
W:INV : Inversion in WH-Qs
Y:INV : Inversion in YN-Qs
E:CON : Connective in EYN-Qs
E:INV : Non-inversion in EYN-Qs

Appendix 1a. Development of the Rules of the Interrogative System



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Appendix 1b. Rasch Statistics

(1) Oral Production

Group	SD	Reliability Index	Separation Coefficient
EMHK	1.658	0.909	3.15
CMHK	1.864	0.938	3.87
CMG	1.917	0.946	4.19

(2) Dialogue Completion

Group	SD	Reliability Index	Separation Coefficient
EMHK	1.555	0.880	2.70
CMHK	1.800	0.927	3.56
CMG	1.841	0.931	3.69

(3) Grammaticality Judgments

Group	SD	Reliability Index	Separation Coefficient
EMHK	0.887	0.742	1.70
CMHK	0.791	0.723	1.61
CMG	0.698	0.696	1.51
NS	1.011	0.677	1.45

(4) Error Correction(Explanation)

Group	SD	Reliability Index	Separation Coefficient
EMHK	2.185	0.936	3.83
CMHK	1.871	0.925	3.51
CMG	1.733	0.298	3.58

(5) Error Correction

Group	SD	Reliability Index	Separation Coefficient
EMHK	1.988	0.929	3.62
CMHK	2.048	0.947	4.23
CMG	1.723	0.931	3.68

Appendix 2a. Mean Percentage Scores of Elicitation Tasks

		OP	DC	GJ	CR(E)	CR(C)	CR(J)
EMK		71.66	79.86	61.58	51.26	72.63	74.56
	P6	57.44	64.29	52.83	33.61	44.71	46.36
	S2	75.79	84.08	64.41	59.48	83.75	86.05
	S4	81.74	91.21	67.50	60.68	89.42	91.26
CMK		55.11	67.96	55.99	48.10	60.40	64.90
	P6	41.68	52.71	48.70	31.80	39.61	44.83
	S2	56.94	70.96	55.79	46.25	61.80	67.73
	S4	66.72	80.21	63.47	66.25	79.80	82.14
CMG		49.60	63.31	57.18	53.37	64.44	69.45
	P6	24.61	31.83	51.46	26.46	35.93	44.29
	S2	52.33	70.62	54.58	57.34	67.70	71.26
	S4	71.86	87.47	65.49	76.32	89.69	92.79

Appendix 2b. ANOVA: Subject's Performance Between Tasks

EMK: Tests involving 'TASK' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	15593.87	220	70.88		
TASK	24199.04	5	4839.81	68.28	.000

CMK: Tests involving 'TASK' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	11555.55	220	52.53		
TASK	11683.14	5	2336.63	44.49	.000

CMG: Tests involving 'TASK' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	20410.98	220	92.78		
TASK	12543.72	5	2508.74	27.04	.000

Appendix 2c. Scheffe Tests: Subjects' Performance Between Tasks

(I) EMHK

		CR(E)	GJ	OP	CR(C)	CR(J)	DC
CELL MEANS		51.26	61.58	71.66	72.63	74.56	79.86
CELL TOTALS		2306.70	2771.10	3224.70	3268.35	3355.20	3593.70
CR(E)	2306.70	0	464.40*	918.00*	961.65*	1048.50*	1287.00*
GJ	2771.10		0	453.60*	497.25*	584.10*	822.60*
OP	3224.70			0	43.65	130.50	369.00*
CR(C)	3268.35				0	86.85	325.35*
CR(J)	3355.20					0	238.50
DC	3593.70						0

df = 220 N = 45 MSE = 70.88 k-1 = 6 F crit = 2.14 p = 0.05
F s = 12.84 t'crit = 286.20 *p = 0.05

(II) CMHK

		CR(E)	OP	GJ	CR(C)	CR(J)	DC
CELL MEANS		48.10	55.11	55.99	60.40	64.90	67.96
CELL TOTALS		2164.50	2479.95	2519.55	2718.00	2920.50	3058.20
CR(E)	2164.50	0	315.45*	355.05*	553.50*	756.00*	893.70*
OP	2479.95		0	39.60	238.05	440.55*	578.25*
GJ	2519.55			0	198.45	400.95*	538.65*
CR(C)	2718.00				0	202.50	340.20*
CR(J)	2920.50					0	137.70
DC	3058.20						0

df = 220 N = 45 MSE = 52.53 k-1 = 6 F crit = 2.14 p = 0.05
F s = 12.84 t'crit = 246.38 *p = 0.05

(III) CMG

		OP	CR(E)	GJ	DC	CR(C)	CR(J)
CELL MEANS		49.60	53.37	57.18	63.31	64.44	69.45
CELL TOTALS		2232.00	2401.65	2573.10	2848.95	2899.80	3125.25
OP	2232.00	0	169.65	341.10*	616.95*	667.80*	893.25*
CR(E)	2401.65		0	171.45	447.30*	498.15*	723.60*
GJ	2573.10			0	275.85	326.70	552.15
DC	2848.95				0	50.85	276.30
CR(C)	2899.80					0	225.45
CR(J)	3125.25						0

df = 220 N = 45 MSE = 92.78 k-1 = 6 F crit = 2.14 p = 0.05
F s = 12.84 t'crit = 327.44 *p = 0.05